

CURRICULUM VITAE

NAME: Andrew Thomas Groover
ADDRESS: 81 Carrigan Dr, Aiken Center
University of Vermont
Burlington VT 05405
(530) 220-4010
Andrew.t.groover@usda.gov

EDUCATION:
1997-2000 Post Doctoral Research
Cold Spring Harbor Laboratory, NY
1993-1997 Ph.D. Biology
University of North Carolina at Chapel Hill
1989-1991 MS Forest Genetics
University of Georgia
1984-1988 BS Forest Science
University of Georgia

EMPLOYMENT:
2022-present Research Geneticist
US Forest Service, Northern Research Station
2000-present Research Geneticist
US Forest Service, Pacific Southwest Research Station
2001-present Adjunct Assistant/Associate/Full Professor
Department of Plant Biology, University of California
Davis
2003-2011 Project Leader
US Forest Service, Institute of Forest Genetics
Davis and Placerville CA
2003-present Plant Biology Graduate Group
University of California Davis

RECENT PROFESSIONAL ACTIVITIES:

- Co-organizer Forest Tree Drought Physiology Research Innovation Group, May 2022, Arnold Arboretum of Harvard University. Co-organizer Missy Holbrook, Harvard University.
- Member American Society of Plant Biology Governance Committee, Oct 2021-present.
- Co-organizer International Plant Vascular Biology Conference, June 2019, Asilomar CA. Co-organizers Mechthild Tegeder, WSU and Siobhan Brady, UC Davis.
- Panel member, DOE competitive grants program. June 2018.
- Co-organizer 42nd New Phytologist Symposium “The biology of wood, from cells to trees.” Lake Tahoe, California, July 2018. Co-organizer Shawn Mansfield, UBC.

- Discussion leader for Gordon Conference “Multiscale vascular biology” Mount Snow Vermont, June 2018
- Strategic Advisor for the journal, *Plants People Planet* (2017-)
- Editor of the book “Evolutionary Genomics of Angiosperm Trees. (Springer 2017) Co-editor Quentin Cronk.
- Editor (2012-) and Section Head of Physiology and Development (2017-2023), *New Phytologist*
- Panel member, USDA AFRI competitive grants panel. September 2015.
- Program Committee, Society of Developmental Biology 74th annual conference. Snowbird Utah, July 2015.
- Co-organizer of conference “The genomes of forest trees: new frontiers of forest biology” Arnold Arboretum of Harvard University, June 2015. Co-organizer William Friedman.
- Panel member DOE competitive grants panel, March 2015.
- Chair of Pacific Southwest Research Station Scientists Advisory Council 2012-2014
- Editor special issue of *International Journal of Plant Science* focusing on evolution and development of woody plants. Quentin Cronk co-editor
- Member Society for Developmental Biology
- Member American Society of Plant Biologists
- Member International Association of Wood Anatomists
- Member of the wood ontology working group (part of NSF Plant Ontology), New York Botanical Garden 2012.
- Panel member, USDA AFRI competitive grant panel, Oct 2011
- Steering committee, Selection committee chair, Symposium committee (2010-2015) for the NSF Research Coordination Network, Evo-Devo-Eco Network (EDEN). PI Cassandra Extavour.
- Scientific Advisory Board member, Genome BC Populus Biofuels Feedstock Genomics Project, University of British Columbia (2008-2011)
- Co-organizer, “Evolution and Development of Woody Plants” catalysis meeting at the National Evolutionary Synthesis Center, Duke University, October 2011. Co-organizer Quentin Cronk, University of British Columbia
- Editor of the book *Genetics and Genomics of Populus* (2010, Springer). Co-editors S. Janssen and R. Bhalerao, SLU Umeå, Sweden.
- Co-organizer, “Plant Development in a Changing World” at the 68th annual meeting of the Society for Developmental Biology in San Francisco, July 2009. Co-organizers Dominique Bergmann, Stanford University and Chelsea Specht, UC Berkeley

GRANTS & AWARDS:

DOE Biological and Environmental Research “Functional analysis of genes encoding ubiquitin proteasome system components affecting complex traits influencing biomass resilience and productivity in poplar.” (\$2.5M total funding, my direct funding \$563,000, 2022-2025)[Nitzan Shabek UCD lead PI]

DOE Biological and Environmental Research “Novel in-vivo visualization of bioenergy metabolic and cellular phenotypes in living woody tissues.” (\$2.2M total funding, My direct funding \$450,000, 2021-2024) [Leslie Sieburth lead PI]

US Forest Service, Pacific Southwest Research Station

“Identifying the biological mechanisms regulating water conduction in trees during drought.” (\$18,000, 2018)

DOE/USDA joint Feedstock Genomics program “Discovery and characterization of disease resistance loci in biomass poplar.” (\$1.1M total funding, My direct funding \$386,078, 2017-2020) [Luca Comai lead PI]

US Forest Service, Pacific Southwest Research Station
“Wood and Water – How the Regulation of Wood Development Determines Adaptation and Response to Drought in Trees.” (\$45,000, 2017)

USDA AFRI
“Modeling and manipulating the regulation of tension wood, an economically important trait for forest products, biofuels and nanotechnology” (\$495,000, 2015-2019)

US Forest Service Pacific Southwest Research Station. Station Director’s Honor Award for Science That Makes a Difference. December 2014.

USDA/DOE Plant Feedstock Genomics
“A novel poplar biomass germplasm resource for functional genomics and breeding” (\$1.2M total funding. My direct funding 459,277: 2014-2017) [Luca Comai lead PI].

Arnold Arboretum of Harvard University
“The next generation of research for forest tree evolution and development.”
Sargent Fellowship Award (\$5,000, 2014)

US Forest Service, Pacific Southwest Research Station
“Production and characterization of triploid poplars as sustainable bioenergy feedstocks” (\$22,000, 2013)

US Forest Service, Pacific Southwest Research Station
“Unique methods for producing superior cultivars for poplar bioenergy coppice” (\$27,000, 2012)

USDA/DOE Plant Feedstock Genomics
“Creation and High-Precision Characterization of Novel *Populus* Biomass Germplasm” (\$1.1M total funding. My direct funding 293,000: 2011-2013) [Luca Comai lead PI].

USDA AFRI Plant Sciences Program
“Regulatory networks controlling hormone signaling during woody growth of forest trees.” (\$498,000: 2011-2014).

USDA NRI Developmental Processes of Plants
“Homeobox Gene Regulation of the Vascular Cambium and Wood Formation” (\$397,000: 2006-2009).

DOE Office of Biological and Environmental Research
“Regulation of Wood Formation in *Populus* by ClassIII HD-Zip Transcription Factors” (\$614,901: 2005-2008).

USDA NRI Plant Genome
“Systems for Gene Discovery and Characterization in Poplar” (\$250,000: 2003-2006).

USDA NRI Genetic Mechanisms
“Gene Trapping and Functional Genomics in Poplar” (\$110,000: 2001-2003).

USDA Certificate of Merit for Outstanding Leadership (2004).

NIH National Research Service Award, 1999-2000.

Cold Spring Harbor Association Post Doctoral Fellowship (1998-1999).

W.C. Coker Fellowship, UNC Chapel Hill (1997).

Research Fellowship, Institute for Marine and Agricultural Research (1996-1997).

Coker Fund Endowed Fellowship for Botanical Sciences (1994-1995).

James Holekamp Memorial Scholarship (1988).

Xi Sigma Pi National Forestry Honor Society (1988).

Georgia Forestry Association Scholarship, (1986-1987).

Phi Eta Sigma, National Freshman Honor Society, (1985).

PUBLICATIONS:

- Groover A (2023). The vascular cambium revisited. *IAWA Journal* 2023: 1-8, DOI 10.1163/22941932-bja10120
- Guo, R, Sorenson, R, Scharf, R, Kock, A, Groover, A, Sieburth, L, Blair, S, and Menon, R (2023). Overcoming the field-of-view to diameter trade-off in microendoscopy via computational optrode-array microscopy. *Optics Express*, Vol 31, No 5, 7505-7514.
- Groover A (2022). New surprises from tree vascular systems. A commentary on: ‘Seasonal patterns of increases in stem girth, vessel development and hydraulic function in deciduous tree species’, *Annals of Botany*, Volume 130, Issue 3, 1 September 2022, Pages xii–xiv
- Azizpor, P, Sullivan, L, Lim, A, and Groover A (2022). Facile labeling of sieve element phloem-protein bodies using the reciprocal oligosaccharide probe OGA⁴⁸⁸. *Frontiers in Plant Science*, doi.org/10.3389/fpls.2022.809923
- Rodriguez-Zaccaro F.D., Henry I, and **Groover A** (2021). Genetic regulation of vessel morphology in *Populus*. *Frontiers in Plant Science*, <https://doi.org/10.3389/fpls.2021.705596>
- Bastiaanse H, Henry I, Tsai H, Lieberman M, Canning C, Comai L, and **Groover A** (2021). A systems genetics approach to deciphering the effect of dosage variation on leaf morphology in *Populus*, *Plant Cell* 33: 940-960 doi:10.1093/plcell/koaa016
- Zinkgraf M, Zhao S, Canning C, Gerttula S, Lu MZ, Filkov V, and **Groover A** (2020). Evolutionary network genomics of wood formation in a phylogenetic survey of angiosperm forest trees. *New Phytologist* doi:10.1111/nph.16819
- Groover A** (2020). Woody plant evolution: Exceptional lianas reveal rules of woody growth. *Current Biology*. 30 (2) PR76-R78.
- Groover A**, and Mansfield S (2020). An introduction to a virtual issue on wood biology. *New Phytologist*. 225 (4) 1401-1403.
- Bastiaanse H, Zinkgraf M, Canning C, Tsai H, Lieberman M, Comai L, Henry I, and **Groover A**. (2019). A comprehensive genomic scan reveals gene dosage balance impacts on quantitative traits in *Populus* trees. *Proceedings of the National Academy of Sciences*. 116 (27) 13690-13699 doi:10.1073/pnas.1903229116
- Du J, Gerttula G, Li Z, Zhao S, Liu Y, Liu Y, Lu M, **Groover A**. (2019). Brassinosteroid regulation of wood formation in poplar. *New Phytologist*. doi:10.1111/nph.15936
- Rodriguez-Zaccaro D, and **Groover A** (2019). Wood and water: How trees modify wood development to cope with drought. *Plants People Planet* doi.org/10.1002/ppp3.29.
- Tomescu A, and **Groover A** (2018). Mosaic modularity: an updated perspective and research agenda for the evolution of vascular cambial growth. *New Phytologist*. doi.org/10.1111/nph.15640 (invited Tansley Review)

- Tuskan G, Groover A., et al (2018). Hardwood tree genomics: Unlocking woody plant biology. *Frontiers in Plant Science*. doi.org/10.3389/fpls.2018.01799
- Zinkgraf M, **Groover A**, and Filkov V (2018). Reconstructing gene networks of forest trees from gene expression data: Toward higher resolution approaches. In: Kalajdziski S., Ackovska N. (eds) *ICT Innovations 2018. Engineering and Life Sciences. ICT 2018. Communications in Computer and Information Science*, vol 940. Springer.
- Shu W, Zhou H, Jiang C, Zhao S, Wang L, Li Q, Yang Z, **Groover A**, Lu MZ (2018). The auxin receptor TIR1 homolog (PagFBL1) regulates adventitious rooting through interactions with Aux/IAA28 in *Populus*. *Plant Biotechnology Journal*. doi.org/10.1111/pbi.12980
- Zinkgraf M, Gerttula S, Zhao S, Filkov V, **Groover A** (2018). Transcriptional and temporal response of *Populus* stems to gravi-stimulation. *Journal of Integrative Plant Biology*. doi: 10.1111/jipb.12645
- Valverde F, **Groover A**, Romero JM (2017). Editorial: Evolution of gene regulatory networks in plant development. *Frontiers in Plant Science*. 15;8:2126 doi: 10.3389/fpls.2017.02126
- Groover A** (2017). Age-related changes in tree growth and physiology. In: eLS. John Wiley & Sons, Ltd: Chichester. DOI: 10.1002/9780470015902.a0023924
- Zinkgraf M, Gerttula S, **Groover A** (2017). Transcript profiling of a novel plant meristem, the monocot cambium. *Journal of Integrative Plant Biology* 59(6):436-449. doi: 10.1111/jipb.12538. (*featured on journal cover*)
- Zinkgraf M, **Groover A**, and Filkov V (2017). Identifying gene coexpression networks underlying the dynamic regulation of wood-forming tissues in *Populus* under diverse environmental conditions. *New Phytologist* doi: 10.1111/nph.14492
- Gerttula S, and **Groover A** (2017). Immunolocalization in secondary xylem of *Populus*. In: *Xylem: Methods and Protocols, Methods in Molecular Biology vol 1544*. De Lucas and Etchells (ed.), Springer.
- He X and **Groover A** (2016). The genomics of wood formation in angiosperm trees. In: *Evolutionary and comparative genomics of angiosperm trees*. Groover and Cronk (Eds.) Springer.
- Zinkgraf M, Haiby K, Lieberman M, Comai L, Henry I, and **Groover A** (2016). Creation and analysis of irradiation hybrids in *Populus*. *Current Protocols in Plant Biology* 1:431-450. 10.1002/cppb.20025
- Groover A** (2016). Reaction woods and gravitropisms of forest trees. *New Phytologist* 10.1111/nph.13968 (invited Tansley Review)
- Ariani A, Romeo S, **Groover A**, Sebastiani L (2016). Comparative epigenomic and transcriptomic analysis of *Populus* roots under excess Zn. *Environmental and Experimental Biology* 132: 16-27.
- Gerttula S, Zinkgraf M, Muday G, Lewis D, Ibatullin F, Brumer H, Hart F, Mansfield, S, Filkov V, and **Groover A** (2015). Transcriptional and hormonal regulation of gravitropism of woody stems in *Populus*. *Plant Cell* 27: 2800-2813 (*featured on journal cover*)
- Groover A** (2015). Genomic science provides new insights into the biology of forest trees. *New Phytologist* 208(2), 302-305.

- Henry I, Zinkgraf M, **Groover A**, Comai L (2015). A system for dosage-based functional genomics in poplar. *Plant Cell* 27: 2370-2383
- Hussy S, Mizrachi E, **Groover A**, Berger D, Myburg A (2015). Genome-wide mapping of H3 lysine 4 trimethylation in *Eucalyptus grandis* developing xylem. *BMC Plant Biology* 15:117 doi:10.1186/s12870-015-0499-0
- Kidner C, **Groover A**, Thomas D, Emelianova K, Soliz-Gamboa C, and Lens F (2015). First steps in studying the origins of secondary woodiness in Begonia (Begoniaceae): combining anatomy, phylogenetics, and stem transcriptomics. *Biological Journal of the Linnean Society*. 04/2015: DOI: 10.1111/bij.12492
- Liu L, Ramsey T, Zinkgraf M, Sundell D, Street N, Filkov V, and **Groover A** (2015). A resource for characterizing genome-wide binding and putative target genes of transcription factors during secondary growth and wood formation in *Populus*. *Plant Journal* 82, 887-898.
- Liu L, Zinkgraf M, Petzold H, Beers E, Filkov V, and **Groover A** (2015). The *Populus* ARBORKNOX1 homeobox transcription factor regulates woody growth through binding to evolutionarily conserved target genes of diverse function. *New Phytologist* 205(2) 682-94.
- Liu L, Missirian V, Zinkgraf M, **Groover A***, and Filkov V* (2014). Evaluation of experimental design and computational parameter choices affecting analyses of ChIP-seq and RNA-seq data in undomesticated poplar trees. *BMC Genomics* 15(Suppl 5):S3 *co-corresponding authors
- Liu L, Filkov V, and **Groover A** (2013). Modeling transcriptional networks regulating secondary growth and wood formation in forest trees. *Physiologia Plantarum*. DOI: 10.1111/ppl.12113
- Groover A**, and Cronk Q (2013). From Nehemiah Grew to Genomics: the emerging field of evo-devo research for woody plants. *International Journal of Plant Science* 174(7), 959-963.
- Groover A**, and Janssen S (2013). Comparative and evolutionary genomics of forest trees. *In: Challenges and opportunities for the world's forests in the 21st century*" Fenning (ed.), Springer.
- Lucas W, **Groover A**, Lichtenberger R, Furuta K, Yadav S, Helariutta Y, He X, Fukuda H, Kang J, Brady S, Patrick J, Sperry J, Yoshida A, Lopez-Millan A, Grusak M, and Kachroo P (2013). The plant vascular system: Evolution and functions. *J. Int. Plant Biol.* 55(4):294-388.
- Groover A**, and Dosmann M (2012). The important of living botanical collections for plant biology and the "next generation" of evo-devo research. *Frontiers in Plant Evolution and Development*. 3: 1-5.
- Lens A, Cooper L, Gandolfo M, **Groover A**, Jaiswal P, Lachenbruch B, Spicer R, Stanton M, Stevenson D, Walls R, and Wegrzyn J (2012). An extension of the plant ontology project supporting wood anatomy and development research. *IAWA Journal*. 33(2): 113-117.
- Du J, Miura E, Robischon M, Martinez C, and **Groover A** (2011). The *Populus* Class III HD ZIP transcription factor *POPCORONA* affects cell differentiation during secondary growth of woody stems. *PLoS ONE*. 6:2 e17458.

- Robischon M, Du J, Miura E, and **Groover A** (2011). The *Populus* Class III HD ZIP, *popREVOLUTA*, influences cambium initiation and patterning of woody stems. *Plant Physiology*. 155: 1214-1225.
- Spicer R, and **Groover A** (2010). The evolution of development of vascular cambium and secondary growth. *New Phytologist*. 186: 577-592.
- Groover A**, Nieminen K, Helariutta Y, and Mansfield S (2010). Wood formation in *Populus*. In: *Genetics and Genomics of Populus*. Jansson, Bhalerao, and **Groover** (eds). Springer.
- Du J, and **Groover A** (2010). Transcriptional control of secondary growth and wood formation. *J. Integrative Plant Biol.* 52(1): 17-27.
- Du J, Mansfield S, and **Groover A** (2009). The *Populus* Homeobox Gene *ARBORKNOX2* Regulates Cell Differentiation During Secondary Growth. *Plant Journal*. 60: 1000-1014.
- Abzhanov A, Extavour C, **Groover A**, Hodges S, Hoekstra H, Kramer E, and Monteiro A (2008). Are we there yet? Tracking the development of new model systems. *Trends in Genetics* 24: 353-360.
- Groover A** (2007). Will genomics guide a greener forest biotech? *Trends in Plant Science*, 12: 234-238. (featured on journal cover)
- Tuskan GA, Difazio S, Jansson S, Bohlmann J, Grigoriev I, Hellsten U, Putnam N, Ralph S, Rombauts S, Salamov A, Schein J, Sterck L, Aerts A, Bhalerao RR, Bhalerao RP, Blaudez D, Boerjan W, Brun A, Brunner A, Busov V, Campbell M, Carlson J, Chalot M, Chapman J, Chen GL, Cooper D, Coutinho PM, Couturier J, Covert S, Cronk Q, Cunningham R, Davis J, Degroove S, Dejardin A, Depamphilis C, Detter J, Dirks B, Dubchak I, Duplessis S, Ehlting J, Ellis B, Gendler K, Goodstein D, Gribskov M, Grimwood J, **Groover A**, Gunter L, Hamberger B, Heinze B, Helariutta Y, Henrissat B, Holligan D, Holt R, Huang W, Islam-Faridi N, Jones S, Jones-Rhoades M, Jorgensen R, Joshi C, Kangasjarvi J, Karlsson J, Kelleher C, Kirkpatrick R, Kirst M, Kohler A, Kalluri U, Larimer F, Leebens-Mack J, Leple JC, Locascio P, Lou Y, Lucas S, Martin F, Montanini B, Napoli C, Nelson DR, Nelson C, Nieminen K, Nilsson O, Pereda V, Peter G, Philippe R, Pilate G, Poliakov A, Razumovskaya J, Richardson P, Rinaldi C, Ritland K, Rouze P, Ryaboy D, Schmutz J, Schrader J, Segerman B, Shin H, Siddiqui A, Sterky F, Terry A, Tsai CJ, Uberbacher E, Unneberg P, Vahala J, Wall K, Wessler S, Yang G, Yin T, Douglas C, Marra M, Sandberg G, Van de Peer Y, Rokhsar D. (2006). The genome of black cottonwood, *Populus trichocarpa* (Torr. & Gray). *Science*, 15: 1596-1604. (featured on journal cover)
- Groover A**, Mansfield S, DiFazio S, Dupper G, Fontana J, Millar R, and Wang Y. (2006). The *Populus* homeobox gene *ARBORKNOX1* reveals overlapping mechanisms regulating the shoot apical meristem and the vascular cambium. *Plant Mol Biol*, 61: 917-932. (featured on journal cover)
- S. Filichkin, Q. Wu, V. Busov, R. Meilan, C. Lanz-Garcia, **A. Groover**, B. Goldfarb, C. Ma, P. Dharmawardhana, A. Brunner, and S. Strauss (2006). Enhancer trapping in woody plants: Isolation of a putative AT-hook motif transcription factor ET304 and characterization of the expression patterns conferred by its promoter in transgenic *Populus* and *Arabidopsis*. *Plant Sci*, 171: 206-216.

- A. Groover** and M. Robischon (2006). Developmental mechanisms regulating secondary growth in woody plants. *Current Opinion in Plant Biology*. 9: 55-58.
- V. Busov, M. Fladung, **A. Groover**, and S. Strauss (2005). Insertional mutagenesis in *Populus*: Relevance and feasibility. *Tree Genetics and Genomes*. 1: 135-142.
- A. Groover** (2005). What genes make a tree a tree? *Trends Plant Sci*. 10: 210-214.
- A. Groover**, J. Fontana, G. Dupper, C. Ma, R. Martienssen, S. Strauss, and R. Meilan (2004). Gene and enhancer trap tagging of vascular-expressed genes in poplar trees. *Plant Physiol*. 134: 1742-1751.
- M. Byrne*, **A. Groover***, J. Fontana, and R. Martienssen (2003). Phyllotactic pattern and stem cell fate are determined by the *Arabidopsis* homeobox gene *BELLRINGER*. *Development* 130: 3941-3950. * *shared first-authorship*
- A. Groover**, J. Fontana, J. Arroyo, C. Yordan, W. McCombie, and R. Martienssen (2003). Secretion trap tagging of secreted and membrane-spanning proteins using *Arabidopsis* gene traps. *Plant Physiol*. 132: 698-708.
- A. Groover**, A. Pattishall, A. Jones. (2003). IAA8 expression during vascular cell differentiation. *Plant Mol Biol*, 51:427-435. (*featured on journal cover*)
- A. Groover** and D. Jackson (2001). Live-cell imaging of GFP. In *Arabidopsis – A Laboratory manual*. Weigel and Glazebrook (eds). Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY.
- A. Jones, **A. Groover**, X.Yu, and T. Perdue (2001). Final and fatal step of tracheary element differentiation. *Mol. Breeding Woody Plants*. Morohoshi and Komamine (eds). Elsevier.
- P. Springer, D. Holding, **A. Groover**, C. Yordan, and R. Martienssen (2000). The essential Mcm7 protein PROLIFERA is localized to the nucleus of dividing cells during the G(1) phase and is required maternally for early *Arabidopsis* development. *Development*, 127(9) 1815-22.
- A. Groover** and A. Jones (1999). Tracheary element differentiation involves a novel mechanism coordinating programmed cell death and secondary cell wall synthesis. *Plant Physiology*, 119 (2) 375-384. (*featured on journal cover*)
- A. Groover**, N. DeWitt, A. Heidel, and A. Jones (1997). Programmed cell death of plant tracheary elements differentiating in vitro. *Protoplasma*, 196, 197-211.
- A. Groover**, C. Williams, M. Devey, J. Lee, and D. Neale (1995). Sex-related differences in the rate of meiotic recombination in *Pinus taeda*. *J. Heredity* 86(2) 157-158.
- A. Groover**, M. Devey, T. Fiddler, J. Lee, R. Megraw, T. Mitchel-Olds, B. Sherman, S. Vujeic, C. Williams, and D. Neale (1994). Identification of quantitative trait loci influencing wood specific gravity in an outbred pedigree of loblolly pine. *Genetics* 138, 1293-1300.
- M. Ahuja, M. Devey, **A. Groover**, K. Jermstad, and D. Neale (1994). Mapped DNA probes from loblolly pine can be used for restriction fragment length polymorphism mapping in other conifers. *Theor Appl Genet* 88, 279-282.

SELECTED LECTURES (*last seven years*):

- A. Groover. Abiotic stress resilience and climate change – how do we integrate abiotic stress and climate change with resistance breeding programs? USFS Applied Disease and Pest Resistance Programs Workshop. Dorena Genetic Resource Center, Cottage Grove, OR. July 2023.
- A. Groover, I. Henry, D. Rodriguez. Regulation of cell size of vessel elements in *Populus*. International Association of Wood Anatomists. January 2023 (virtual talk)
- A. Groover, I. Henry, D. Rodriguez. Regulation of cell size of vessel elements, and related effects on water transport and drought response in *Populus*. Keynote lecture, 10th International Plant Biomechanics Conference. Lyon France. August 2022.
- A. Groover, I. Henry, D. Rodriguez. Regulation of vessel trains impacting drought resistance in trees. 6th International Conference on Plant Vascular Biology. Berlin Germany. July 2022.
- A. Groover, I. Henry, D. Rodriguez. Genetic regulation of vessel traits affecting water transport and drought response in *Populus*. IUFRO Tree Biotechnology Conference. Harbin China. July 2022. (virtual talk)
- A. Groover, I. Henry, D. Rodriguez. Regulation of vessel element traits in *Populus*. Forest tree drought physiology innovation workshop. Arnold Arboretum of Harvard University. May 2022.
- A. Groover, I. Henry, D. Rodriguez. 2nd International Symposium on Tree Genomics, Physiology and Molecular Breeding. Zhejiang University, China. Oct 2021 (Keynote lecture, virtual talk).
- A. Groover. Wood and water: How trees modify wood to cope with drought. US Forest Service Pacific Southwest Research Station. February 2021.
- A. Groover. A systems genetics approach to deciphering the effect of dosage variation on leaf morphology in *Populus*. Keynote lecture, International Young Scientists Forum on Modern Forestry: Innovation and Sustainability. Zhejiang A&F University, Hangzhou, China (virtual talk). December 2020.
- A. Groover. Exploring the complex biology of trees using genomics. Lancaster University, UK. May 2020. (Online lecture)
- A. Groover. Integrated genomic approaches for understanding the complex biology of forest trees. Penn State. March 2020.
- H. Bastiaanse, L. Comai, I. Henry, and A. Groover. Genome-wide scans reveal how gene dosage affects quantitative trait variation in *Populus*. Plant and Animal Genome Conference. San Diego, CA. January 2020.
- A. Groover. Genomic approaches for understanding the complex biology of trees. Michigan Tech. November 2019.
- A. Groover, H. Bastiaanse, D. Rodriguez-Zaccaro. Understanding the genetic basis of quantitative trait variation in *Populus*. People, Plant, Planet Symposium. Royal Botanic Gardens, Kew. September 2019.
- H. Bastiaanse, M. Zinkgraf, C. Canning, H. Tsai, M. Lieberman, L. Comai, I. Henry, A. Groover. Genome-wide scans reveal how gene dosage affects quantitative

- trait variation in *Populus*. Keynote lecture, IUFRO Tree Biotechnology Conference. June 2019.
- A. Groover. Embracing the complexity of nature: Evolutionary and developmental genomics of complex traits in forest trees. University of Edinburgh. April 2019.
- A. Groover. Embracing the complexity of nature: Genomic approaches for understanding the development and evolution of forest trees. UC Davis Integrative Genetics and Genomics Graduate Group. February 2019.
- A. Groover. Embracing the complexity of nature: Genomic approaches for understanding the development and evolution of forest trees. Arnold Arboretum of Harvard University. December 2018.
- A. Groover, H. Bastiaanse, M. Zinkgraf, I. Henry, L. Comai. Functional genomics for quantitative trait dissection in forest trees. Agriculture Bioscience International Conference. Weifang, China. September 2018.
- A. Groover, S. Gerttula, M. Zinkgraf, H. Bastiaanse, V. Filkov, S. Zhou, MZ Lu. Genes and mechanisms underlying the evolution and development of wood in angiosperm trees. 42nd New Phytologist Symposium “Biology of wood, from cells to trees.” Tahoe, CA. July 2018.
- A. Groover. Subcellular development: Plasticity in sub-cellular development of plant vascular systems. Gordon Conference on Multiscale plant vascular development. Mount Snow VT. June 2018.
- A. Groover. Molecular and genomic insights into the evolution and development of wood in forest trees. University of Göttingen, Germany. April 2018.
- A. Groover. Evolution and development of wood formation in forest trees. 41st New Phytologist Symposium “Plant Sciences for the Future.” Nancy, France April 2018.
- A. Groover. Molecular and genomic insights into the evolution and development of wood in forest trees. University of Vermont. March 2018.
- H. Bastiaanse, L. Comai, A. Groover, I. Henry, G. Newcombe, R. Rousseau. Discovery and characterization of disease resistance loci in poplar. DOE Principal Investigator Meeting. Washington DC. February 2018.
- A. Groover. Embracing the complexity of nature – computational and genomic approaches for understanding the development and evolution of forest trees. Canadian Society of Plant Biology Conference. Vancouver, Canada. July 2017.
- A. Groover. Genomic approaches for understanding wood formation in trees. Zhejiang University, Hangzhou, China. June 2017.
- A. Groover. Genomic approaches for understanding wood formation in trees. Chinese Academy of Forestry, Beijing, China. June 2017.
- A. Groover. Molecular genetic regulation of wood formation in forest trees. UC Davis Department of Plant Science Seminar Series. May 2017.
- A. Groover. Genomic perspectives of wood formation in trees. Harvard University Herbaria Seminar Series. March, 2017.
- A. Groover. Genomic insights into the genetic regulation of growth and development of forest trees. Humboldt State University, November 2016.

- A. Groover. Systems biology of tension wood. Pan-American Congress on Plants and Bioenergy. Sante Fe, NM Aug 2016.
- A. Groover. Modeling transcriptional networks regulating secondary growth and wood formation in forest trees. International Plant Vascular Biology, Shenzhen, China, July 2016.
- A. Groover. Genomic-enabled insights into growth and wood formation in *Populus*. Umeå Plant Science Centre, Umeå University, Sweden, March 2016.
- A. Groover, S. Gerttula, M. Zinkgraf, H. Brumer, S. Mansfield, V. Filkov. Transcriptional and hormonal control of gravitropisms in forest trees. Colorado State University, October 2015.
- A. Groover, S. Gerttula, M. Zinkgraf, H. Brumer, S. Mansfield, V. Filkov. Transcriptional and hormonal control of gravitropism in forest trees. Hohhot, China, August 2015.
- A. Groover, S. Gerttula, M. Zinkgraf, H. Brumer, S. Mansfield, V. Filkov. Transcriptional and hormonal control of gravitropisms in forest trees. Society of Developmental Biology 74th Annual Meeting, Snowbird Utah, July 2015.
- A. Groover, S. Gerttula, M. Zinkgraf, S. Mansfield, V. Filkov. Transcriptional and hormonal control of gravitropism and tension wood formation in *Populus*. Plant and Animal Genome Conference. San Diego, Ca. January 2015.
- A. Groover. Genomic approaches for understanding biomass production and wood formation in trees using *Populus*. Symposium, From Plant Growth to Biomass Products. Huazhong Agricultural University, Wuhan, China. Sept 2014.
- A. Groover, L. Comai, I. Henry, and M. Zinkgraf. A *Populus* gene dosage resource for functional genomics and breeding. International Poplar Symposium, University of British Columbia, July 2014.
- A. Groover. Regulation of woody growth in *Populus*. Regulatory networks controlling hormone signaling during woody growth of forest trees. USDA AFRI project Directors Meeting. Washington DC May 2014.
- A. Groover. Regulation of woody growth in *Populus*. Oxford University, Dept. Plant Science. March 2014.
- A. Groover. Modeling transcriptional regulation of woody growth in *Populus*. Joint BioEnergy Institute (JBEI), Emeryville, CA. Oct 2013.
- L. Liu, V. Filkov, and A. Groover. A wiring diagram for genetic regulation of secondary growth and wood formation. International Conference on Plant Vascular Biology. Helsinki, Finland. July 2013.
- A. Groover, L. Comai, V. Filkov, I. Henry, and L. Liu. Creating gene network and gene dosage models of woody growth regulation. IUFRO Tree Biotechnology Conference. Ashville NC May 2013.
- A. Groover. Developing a genome-scale view of the genetic processes regulating the vascular cambium and wood formation in trees. Arnold Arboretum of Harvard University. May 2013.
- A. Groover. Written in the Genes: Forest Tree Evolution, Growth, and Reaction to Climate Change. Public lecture at Arnold Arboretum of Harvard University. May 2013.

- A. Groover. Developing a genome-scale view of the genetic processes regulating the vascular cambium and wood formation in trees. Ohio State Univ, Columbus OH. April 2013.
- L. Liu, V. Filkov and A. Groover. Revealing the regulatory network of stem secondary growth in *Populus*. Plant and Animal Genome Conference. San Diego, CA. January 2013.
- I. Henry, A. Groover, L. Comai. A library of dosage variants as a fast source of novel *Populus* germplasm. Plant and Animal Genome Conference. San Diego, CA. January 2013.
- A. Groover and L. Liu. Understanding and manipulating transcriptional regulation of biomass production and wood properties. Chinese Academy of Sciences, Beijing. Oct 2012.
- A. Groover. Next generation sequencing tools for understanding growth and development in *Populus*. Smithsonian Institution, Washington DC, Nov 2012.
- A. Groover, V. Filkov, L. Liu. Modeling the Transcriptional Networks that Regulate Secondary Growth in Trees. UC Davis Biological Networks Seminar Series. Davis CA April 2012.
- A. Groover. Examples of genomic data used for wood developmental biology and woody biomass research. Wood Ontology Meeting, New York Botanical Gardens. Yonkers, NY. Jan 2012.
- A. Groover. Genes and mechanisms regulating secondary growth and wood formation in trees. University of California Merced. Merced, CA. Nov 2011.
- A. Groover. Development and evolution of forest trees. Royal Botanic Garden. Edinburgh, Scotland. Nov 2011.
- A. Groover. What genes make a tree a tree? 58th Annual Systematics Symposium. "Trees," in honor of the United Nation's declaration that 2011 is the year of the tree. Missouri Botanical Garden. St Louis, Missouri. Oct 2011.
- A. Groover. Evolution and development of secondary growth and wood formation. International Botanical Congress. Melbourne, Australia. July 2011.
- A. Groover. What genes make a tree a tree? Evolution and development of woody growth. University of British Columbia. January 2011.
- A. Groover. Evolution and development of secondary growth in trees. Swedish Univ. Agricultural Sciences, Umeå, Sweden. April 2010.
- A. Groover. Evolution and development of the vascular cambium and secondary growth. International Conference on Plant Vascular Biology. Ohio State University. Columbus, Ohio. July 2010.
- A. Groover. Genetic regulation of the vascular cambium and wood formation. University of Georgia, Department of Genetics and School of Forest Resources. Nov 2009.
- A. Groover, Du, J., and Robischon, M. Regulation of cambium function and tissue polarity during secondary growth in *Populus*. International Plant Molecular Biology Meeting. St Louis, MO. Oct 2009.
- A. Groover. Secondary growth in trees: Regulation of complex, adaptive wood phenotypes. Society of Developmental Biology 68th Annual Meeting. San Francisco, CA. July 2009.

- A. Groover. Transcriptional mechanisms regulating tissue development and patterning in tree stems. International Plant Vascular Biology and Agriculture Conference. Chongqing, China. June 2009.
- A. Groover. Transcriptional regulation of secondary growth and wood formation in forest trees. Chinese Academy of Forestry. Beijing, China. June 2009.
- A. Groover and Juan Du. Transcriptional regulation of wood formation. FuncFiber International Symposium on Wood Science. Swedish University of Agricultural Sciences. Umea, Sweden. March 2008.
- A. Groover. Homeobox Gene Regulation of the Vascular Cambium and Wood Formation. USDA NRI Genes to Products Meeting. April 2008.
- A. Groover. *Populus* as model angiosperm trees – what we can learn about plant evolution and development from a walk in the woods. Invited lecture at the joint ASPB and BSA meeting in Chicago. July 2007.
- A. Groover. *Populus* as a model for woody perennial angiosperms. Invited lecture at Radcliffe Institute Workshop on Genetics and Genomics of Emerging Model Systems. Harvard University. May 2007.
- A. Groover. Evolution and genetic regulation of secondary vascular growth. Invited lecture at International Conference on Plant Vascular Biology, Taipei, Taiwan. May 2007.
- A. Groover. Evolution and developmental biology of the cambium. Laval University, Quebec City, Canada. April 2007.